

*Full Length Research Paper*

## Effects of 950 MHz mobile phone electromagnetic fields on the peripheral blood cells of male rabbits

M. R. Sarookhani<sup>1</sup>, A. Safari<sup>2\*</sup>, M. Zahedpanah<sup>2</sup>, M. Asiabanha Rezaei<sup>2</sup> and V. Zaroushani<sup>2</sup>

<sup>1</sup>School of Allied Medicine and Cell and Molecular Research Center, Qazvin University of Medical Sciences, Qazvin, Iran.

<sup>2</sup>School of Public Health and Allied Medicine, Qazvin University of Medical Sciences, Qazvin, Iran.

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Today, mobile phones are used frequently and held close to the body. It is believed that microwaves may interfere with the cellular signaling systems, affecting the mechanisms by which the cells balance their functions. The objective of this work is the evaluation of the influence of different intensities of 950 MHz cell phone electromagnetic field (EMF) on the hematological parameters of male rabbits. This study was conducted on 54 male rabbits of average mass of 1400 to 1700 g. The exposure period of simulated mobile phone radiations (950 MHz, 3 and 6 W) was 2 h/day for 2 weeks. The blood from the heart was collected on ethylenediaminetetraacetic acid (EDTA) and was analyzed for hematological parameters, and was then compared with the control group. The results showed an increase ( $P < 0.05$ ) in the white blood cells (WBC) counts in 6 W group when compared with both 3 W and control groups. Platelets (PLT) counts decreased in 3 W group but increased in 6 W group. Lymphocyte counts decreased in 3 and 6 W groups when compared with each other and control group. There were no differences in red blood cells (RBC) counts and related indices of any groups. In conclusions, mobile phone EMF disturb the constant number of some hematological parameters which may reflects from thermal or non-thermal effects of such radiations, but the exact reason for such discrepancies is not easy to identify.

**Key words:** Mobile phone 950 MHz radiations, hematological parameters, rabbits.

### INTRODUCTION

Over the past century, a vast and growing spectrum of man-made electromagnetic fields (EMF) was introduced and the most popular kind of these is mobile phone. These devices are potentially the most dangerous sources of EMF radiation relative to other sources, because mobile phones are held close to the body and are used frequently. In effect, the whole body can act as an efficient antenna to pick up electromagnetic radiation. Signals transmitted by a mobile phone will reach all parts of the body and penetrates living tissue easily. So, the effects of EMF occur at the cellular level (Goldworthy, 2007). In postnatal life in humans, blood cells are normally produced only in the bone marrow. Lymphocytes are produced in the secondary lymphoid organs,

as well as in the bone marrow and thymus gland. The constant cell number of bone marrow and hence peripheral blood are controlled by hematopoietic growth factors which regulate the proliferation and differentiation of hematopoietic precursor cells and facilitate the function of mature cells. These growth factors tend to enhance membrane integrity by binding to their receptors on cell surface and change cell functions and populations via modulation of proliferation or apoptosis. It is believed that microwaves may interfere with the cellular bio-electro-chemical signaling system either by the development of temporary pores or leak in the membrane of the cells by letting small amounts of calcium into the cytosole. Many metabolic processes may be altered by such processes. What happens then depends on what the cells are currently programmed to do. If they are growing, the rate of growth may be increased. If they are repairing themselves, the rate of apoptosis may be increased

\*Corresponding author. E-mail: [safari2400@yahoo.com](mailto:safari2400@yahoo.com).